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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Scott C. Willis

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12/24/2003

DICKE, BILLIG & CZAJA, P.L.L.C.

FIFTH STREET TOWERS

100 SOUTH FIFTH STREET, SUITE 2250

MINNEAPOLIS, MN 55402

EXAMINER

CHANG, EDITH M

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 12/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/591,731

Applicant(s)

WILLIS ET AL.

Examiner

Edith M Chang

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8, 10-14, 17-19, 21-24, 26-29 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 9, 15, 16, 20, 25 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 5. 6) ☐ Other: _____

Art Unit: 2634

DETAILED ACTION

Claim Objections

1. Claims 6-9, 16-18, 20, 30 are objected to because of the following informalities:

Regarding claim 6, change “approximately 1.0 and” to “approximately 1.0 kilohms and”;

Regarding claim 7, change “approximately 0.1 and” to “approximately 0.1 nanofarrads and”;

Regarding claim 8, the term “the pulse width generator” lacks antecedence. It suggests changing it to “the pulse width modulator”;

Regarding claim 9, change “approximately 1.0 and” to “approximately 1.0 kilohms and”;

Regarding claim 16, change “approximately 100 and” to “approximately 100 kilohms and”;

Regarding claims 17, change “approximately 1.0 and” to “approximately 1.0 kilohms and”;

Regarding claim 18, change “approximately 0.1 and” to “approximately 0.1 nanofarrads and”;

Regarding claims 20 & 30, change “approximately 1.0 and” to “approximately 1.0 kilohms and”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

Art Unit: 2634

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 & 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Turner (US 5006973).

Regarding **claims 1 & 12**, Turner discloses an apparatus for spreading electromagnetic interference associated with an electrical system over a range of frequencies (Fig.3; column 2 lines 55-60), the electrical system having a pulse width modulator (49 Fig.3), the apparatus comprising: a power source (45 Fig.3); a binary counter (47 Fig.3, CNTR2 Fig.7); a plurality of resistors (R6, R7 Fig.8) wherein each of the resistors is coupled to an output of the counter (SYNC Fig.8) and coupled to a node (the R7, R8, C24, & C25 Fig.8); a timing resistor (R7/R8 Fig.8) coupled between a first voltage potential (+V5/SG Fig.8) and the node; a timing capacitor (C25/C24 Fig.8) coupled between the node and a second voltage potential (SG/V5 Fig.8); and wherein the node is coupled to an input of the PWM (CT Fig.8).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2634

5. Claims 2-3, & 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Korcharz et al. (US 6049471).

Regarding **claims 2-3 & 13-14**, Turner discloses the binary counter is unidirectional counter which is fully synchronous the TI SN74LS163A (column 9 lines 5-20). Further Korcharz et al. teaches the bi-directional counter (Up/Down counter 290 Fig.10). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the TI SN74LS163A as the up/down counter taught by Korcharz et al. wherein the TI SN74LS163A counter is a unidirectional counter and an up/down bi-directional counter as well to provide control the PWM output (column 17 lines 45-65).

Regarding **claim 21**, further Korcharz et al. teaches a resistor divider (210 Fig.10) coupled between the output of the PWM and an input of the binary counter (294, 290 Fig.10). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the resistor divider taught by Korcharz et al. in Turner's apparatus to smoothly control the cycle of PWM output (column 17 lines 45-65).

Claim 6-7, & 17-18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Unitrode PWM Controller applications notes (UC1842/UC1825).

Regarding **claims 6-7 & 17-18**, Turner discloses the calculation of timing resistor and capacitor (column 10 lines 50-60). Further the UC1825 application notes teach the oscillator circuit of the PWM. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the UC1825 application notes to implement the oscillator circuit wherein the timing resistor and capacitor have values in the range according to the UC1825. The derived specific ranges of the timing resistor or capacitor do not show the uniqueness.

Art Unit: 2634

6. Claims 8, 10-11, 19, 22, 29, & 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Smith (US 5309344).

Regarding **claims 8, 19, & 29**, Turner does not specify the resistor divider network, however Smith teaches a resistor divider network (925-936 FIG. _11A) comprising: a first resistor (935 FIG. _11A) connected to the clock signal of the PWM (R/C 950 FIG. _11A, column 47 lines 56-65); a second resistor connected between the first resistor and a third voltage (925 FIG. _11A); and the clock input of the binary counter is operatively coupled between the first and the second resistors. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Smith's teaching in Turner's oscillator circuit to have a low noise, and highly efficient power converter (column 3 lines 14-20).

Regarding **claim 22**, except a power switch and a filter, Turner discloses all subject matter claimed. Smith teaches a power switch for receiving an input power (820 FIG. _8); a filter operatively coupled to the power switch (978-977-979-972 FIG. _11B). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Smith's teaching in Turner's apparatus to reduce the input ripple current to have a compact size and low cost converters (column 3 lines 60-65).

Regarding **claims 10-11, & 31-32** except to specify the PWM whose fundamental frequency is time-varying, Turner discloses all subject matter claimed: a power source coupled to the PWM (45-49 Fig.3); a resistor/capacitor network (R6-8, C23-25 Fig.8, wherein the time constant of RC changes when the frequency changes); incrementing means for incrementing a binary count (Fig.7); altering means (R6-8 Fig.8, the PWM oscillator, where each resistor is coupled to an output of a binary counter and coupled to a first voltage, the node SG) coupled

Art Unit: 2634

between the incrementing means and the resistor/capacitor network. However Smith teaches the varying frequency (column 26 lines 14-20, column 33 lines 45-55 where frequency is 500KHz). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have a varying frequency PWM taught by Smith in Turner's apparatus to provide a more efficient apparatus to improve the EMI emissions and the power dissipation losses (Abstract, column 8 lines 33-48).

7. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Smith (US 5309344) as applied to claim 22 above, and further in view of Korcharz et al. (US 6049471).

Regarding claims **23-24**, Turner discloses the binary counter is unidirectional counter which is fully synchronous the TI SN74LS163A (column 9 lines 5-20). Further Korcharz et al. teaches the bi-directional counter (Up/Down counter 290 Fig. 10). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the TI SN74LS163A as the up/down counter taught by Korcharz et al wherein the TI SN74LS163A counter is a unidirectional counter and an up/down bi-directional counter as well to provide control the PWM output (column 17 lines 45-65).

Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Smith (US 5309344) as applied to claim 22 above, and further in view of Unitrode PWM Controller applications notes (UC1842/UC1825).

Regarding claims **26-28**, Turner discloses the calculation of timing resistor and capacitor (column 10 lines 50-60). Further the UC1825 application notes teach the oscillator circuit of the PWM. At the time of the invention, it would have been obvious to a person of ordinary skill in

Art Unit: 2634

the art to use the UC1825 application notes to implement the oscillator circuit wherein the timing resistor and capacitor have values in the range according to the UC1825. The derived specific ranges of the timing resistor or capacitor do not show the uniqueness.

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 5006973) in view of Smith (US 5309344) as applied to claim 31 above, and further in view of Korcharz et al. (US 6049471).

Regarding **claim 33**, further Korcharz et al. teaches a resistor divider (210 Fig.10) coupled between the output of the PWM and an input of the binary counter (294, 290 Fig.10). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the resistor divider taught by Korcharz et al. in Turner's apparatus to smoothly control the cycle of PWM output (column 17 lines 45-65).

Allowable Subject Matter

9. Claims 4-5, 9, 15-16, 25, & 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

Art Unit: 2634

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4800.

Edith Chang
December 1, 2003


CHIEH M. FAN
PRIMARY EXAMINER